

### ABSTRACT

A flat panel display substrate (FPDS) testing system configured such that prior to testing, the FPDS is loaded into a pallet to prevent breakage, and to provide electrical connections to test pads on the FPDS. The system achieves high 5 throughput by testing FPDSs using one or more charged particle beams simultaneously with the following operations: unloading of already-tested substrates, loading of substrates ready for testing, assembly of pallets, and alignment of electrical contactors to a large number of FPDS test pads. The system design eliminates a prior art X-Y stage, and all moving electrical connections to the FPDS 10 during testing, reducing costs and improving reliability. In one embodiment, the FPDS testing system has three subsystems: a process chamber, loadlock assembly, and pallet elevator; in another embodiment, the functions of loadlock and pallet elevator are combined to reduce system footprint.